ABSTRACT OF THE INVENTION

An integral cathode for use with x-ray devices. The integral cathode includes an emitter made of a refractory metal such as tungsten, preferably doped with rhenium to afford malleability during construction and assembly. The integral cathode also includes a support cartridge, preferably composed of an electrically non-conductive material such as ceramic, in which the emitter is received. The support cartridge electrically isolates the cathode from the other components and structures of the x-ray device. Additionally, the support cartridge serves to impose, and maintain, a parabolic curve in the emitter. The parabolic form of the emitter naturally shapes an electron beam by causing electrons discharged from the emitter to converge at a focal spot. In this way, both the emission and focusing functions of the cathode are integrated and performed by a single part.

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